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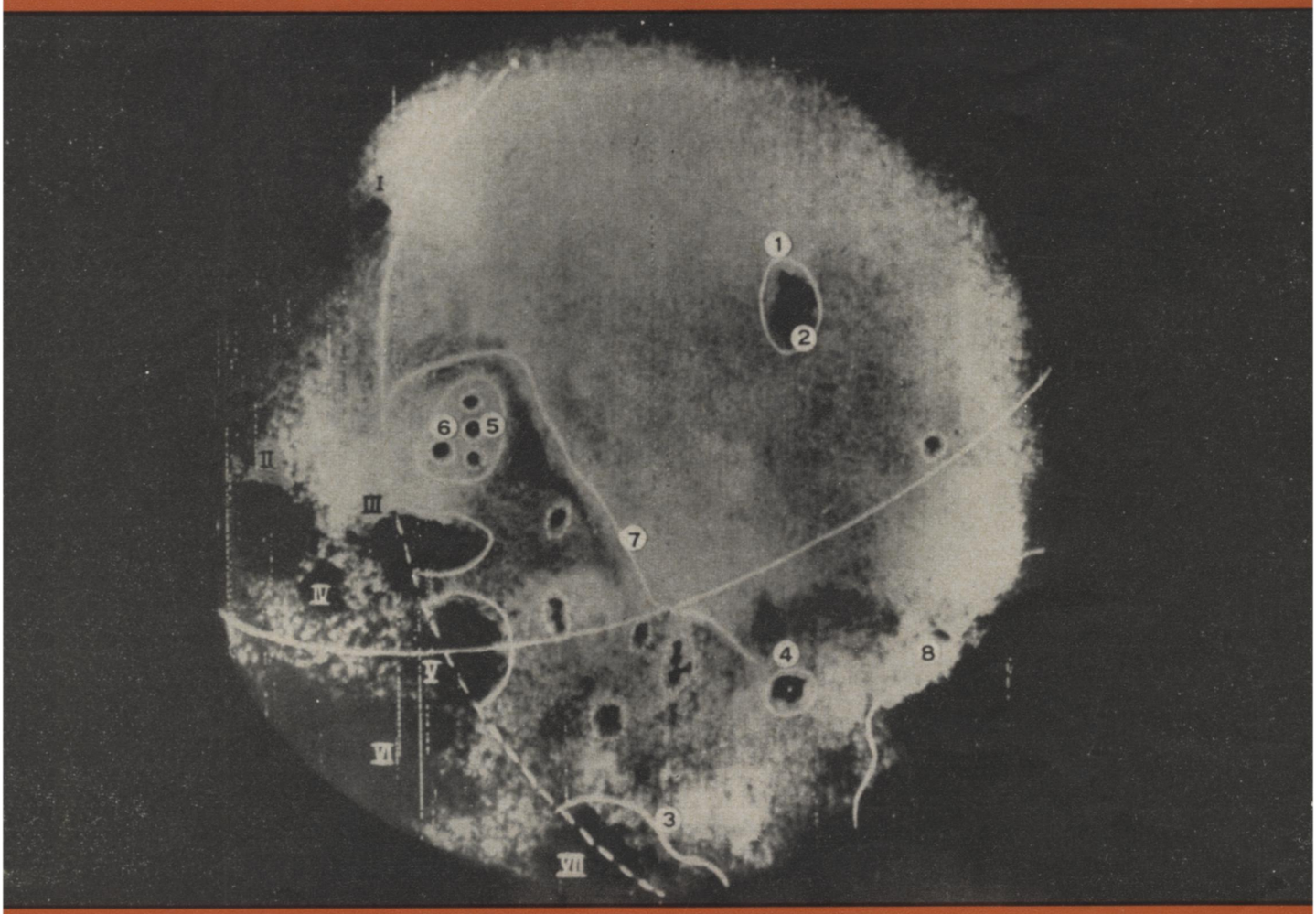
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Unseen Side

See Page 304

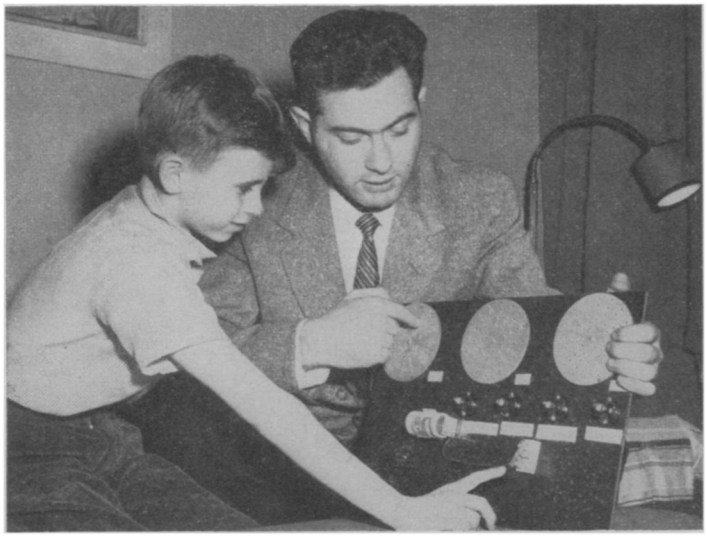
A SCIENCE SERVICE PUBLICATION

For Problem-Solving...Experimentation...Teaching...or Just Fun

BUILD YOUR OWN ELECTRIC BRAIN MACHINE *IN JUST A FEW HOURS!*

Remarkable 400-Component Construction Kit Enables You to Create Any of 125 Brain Machines! Build LOGIC MACHINES that Compare, Reason, Test Intelligence; ARITHMETICAL MACHINES (Binary & Decimal); GAME-PLAYING MACHINES (Tic-Tac-Toe, Nim, Etc.)

Teachers and Scientists: *Design Your Own Machines!*



1959 GENIAC KIT CONTAINS (1) "How to Construct Electrical Brains at Home" —a fully illustrated text book on basic computer design theory and circuits with specific instructions for building 125 circuits. (2) "DESIGN-O-MAT,"® special booklet with instructions for designing your own computers. (3) Wiring Diagram Manual. A special booklet with full scale diagrams. (4) Beginners' Manual—fifteen *extra* experiments to teach the basic symbols of electric circuits. (5) Over 400 components and parts.

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Naval Research Laboratories
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Kansas State University
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Returnable in seven days for full refund if not satisfied. I enclose $..... in full payment.

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GENIAC® is the only kit and text combination that presents the basic ideas of cybernetics, boolean algebra, symbolic logic and computer circuitry for all levels of knowledge and intelligence. Sold to all customers on a one-week return guarantee; actually use it during that time, return it if you decide not to keep it.

WITH GENIAC® you build any of 125 electric brain machines in a few hours by following the clear-cut, step-by-step directions in the basic text provided. Advanced students and scientists can design machines for special problems. No soldering required, and little wiring. Change design of your machines in minutes! Build Binary Adding Machine • Secret Coder & Decoder • Machine for Arithmetical Carrying • Comparing Machine • Reasoning Machine • General Combination Locks • Games Requiring Logic • Machine for a Space Ship's Airlock • Intelligence Tester • Burglar Alarm • Puzzle Solvers and many others.

OVER 400 COMPONENTS AND PARTS

Circuits operate on one flashlight battery, and use ingeniously designed parts. 1959 GENIAC® KIT has been constructed by the original inventor to provide all the advantages of previous electrical brain construction kits plus what we have learned in answering the questions and examining the new designs created by hundreds of users.

SELF-CONTAINED COURSE IN COMPUTER DESIGN

Each GENIAC® comes as a self-contained course in computer design. All instructions are so simple that we have records of intelligent twelve-year-olds designing factoring machines and puzzle-solving circuits—while hundreds of schools and industrial training programs have incorporated our kits in their curricula.

YOUR COST FOR GENIAC KIT: ONLY $19.95 POSTPAID

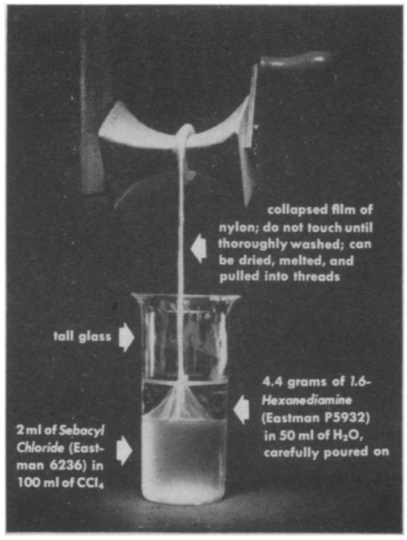
The coupon will bring your GENIAC® Electric Brain Construction Kit and Manuals for only $19.95 postpaid. You may return the Kit within 7 days if you are not completely satisfied. For schools we offer bulk rates on extra texts and parts; for teachers, we offer 10% deduction on GENIAC® if ordered for use in institutions. Send for your Kit today!

SCIENCE KITS, Dept. SL-119-A
Oliver Garfield Co., Inc., 108 E. 16th St., New York 3, N. Y.

Kodak reports on:

the nylon rope trick . . . microfilming brought down to the scientist's level . . . a little something for the taxpayers

A polyamide condensation for the kids to watch but keep their little hands off



Du Pont, which doesn't ordinarily manufacture its nylon this way, was kind enough to publish this in J. Chem. Education *36,* 182. *We have been kind enough to prepare an abstract. Price for our minimum package quantities of the two reactants comes to $6.05. Teachers and Yuletide-bent daddies are reminded of the insidious nature of chlorinated hydrocarbons. Anyone inspired to commercial thoughts is advised to consult with his lawyer about U. S. Patent No. 2,708,617. Everyone who wants these or any of the approximately 3700 organic chemicals we stock (and catalog in Eastman Organic Chemicals, List No. 41) should get in touch with Distillation Products Industries, Eastman Organic Chemicals Department, Rochester 3, N. Y. (Division of Eastman Kodak Company).*

Less than a laundry

Our subsidiary, Recordak Corporation, has recently come out with a portable microfilmer that weighs only 24 pounds and lists for only $845. Do you ask what this has to do with science? Then we are wracked by ambivalent feelings toward you. On the one hand, we feel extra respectful in your presence; a mind so obviously unaccustomed to seek solace in gadgetry is scarce. At the same time, we want to turn you gently toward the light. Certainly you're not the type to seek your solace in paper-shuffling, but you have to prove that, if only to yourself.

Think for a moment like that fabled monster, the efficiency expert. His baleful eye casts about for concentrations of paper. When he sees information being extracted from one pile of papers for summary on yet another piece of paper, his mouth waters. When he sees some poor soul toiling at a task that could go undone but for the necessity of preserving proof of the finer details, he pounces. Our subsidiary, Recordak Corporation, watches from the bushes and purrs benevolently. Get the picture?

It all began in banks a generation ago, spread to department stores and phone companies, and in the last decade has reached enterprises like dry-cleaning establishments, dairies, and medical clinics. Now the idea of microfilming while summarizing has been brought down to the scientist's level. The Recordak Portable Microfilmer is of the right scale in size and cost for work of lesser magnitude (from Recordak's special viewpoint) than getting out the monthly statements of a prosperous laundry.

Documents are fed into the machine face up and returned face down in their original sequence. They are freed for other use, or they can be dumped and yet remain retrievable. They can be up to 12 inches wide and of any length. Reduction ratio is 20:1. Forty-six 8½″ x 11″ sheets can be microfilmed in a minute, smaller documents proportionally faster. Two 100-foot rolls of film can be exposed simultaneously to the same subject matter. Film units are readily removable so that "one-subject" records can be kept separate even though microfilming be done intermittently.

Recordak Corporation, 415 Madison Avenue, New York 17, N. Y., has a nationwide chain of branch offices and processing stations. It is just possible that your problem will remind the salesman of one he solved for the wholesale chicken business and that he will take you out and show you how it works there.

Microelectronics

Ever hear of the Diamond Ordnance Fuze Laboratories? It's a Department of the Army agency in Washington. To support DOFL, the average citizen shells out the federal tax on, let us say, several gallons of gasoline a year or a little tobacco. Since a fuze is a device which times an explosion to blow up his enemy, he probably wouldn't mind the expense if it were explained to him. But, *mirabile dictu* and happy day, prospects brighten that the piddling investment will pay off beyond the dreams of avarice!

DOFL has spawned "microelectronics," the shrinking of electronic assemblies to 1/100 normal size. DOFL became involved through the proximity fuze program, which requires very small and exceedingly rugged components. We are involved through *Kodak Photo Resist, Kodak High Resolution Plates,* and *Kodak Ektagraph Film.* Microelectronics may be bigger than both of us. It may make possible the placement of electronic devices inside the body, for diagnosis or for replacement or repair of human organs with electronic equivalents. It may permit a new directness in the study of the central nervous system.

The theme of microelectronics is that if you want environment-immune, highly "intelligent" circuitry that can handle problems of logic and fit into a tenth of a cubic inch of space or so, you quit at an early stage of the design thinking of transistors, diodes, capacitors, resistors, and such. Instead you think of the circuit as one or more plates half a millimeter thick and fabricated as intricately as necessary out of various conductive, semi-conductive, and dielectric materials disposed among the three dimensions of each plate.

The technique (at least prior to mass-scale production) uses *Kodak High Resolution Plates* on which the geometry of the various sub-circuits is photographed from drawings at great reduction. These then become the masks under which are exposed to ultraviolet light the circuit substrate plates that have been coated with *Kodak Photo Resist.* Where the mask passes u-v, subsequent processing removes the resist and lays open the substrate for either removal of material or insertion of other materials by evaporation, printing, electro-deposition, or chemical deposition. In some operations, deposition is done by squeezing material through openings left in a fine screen in accordance with an applied pattern of blocking, photographically reduced to *Kodak Ektagraph Film.*

The next thing to do is to send to Eastman Kodak Company, Special Sensitized Products Division, Rochester 4, N. Y., for a reprint of "The DOFL Microelectronics Program." Literature on the three Kodak products mentioned here will be thrown in. Thus we nudge you toward great undertakings.

Prices are list and subject to change without notice.

Kodak
TRADE MARK

This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science

At Bell Laboratories, Holmdel, N. J., a horn reflector antenna is beamed skyward by scientists Edward Ohm, David Hogg and Robert DeGrasse. The maser amplifier, which employs a ruby cooled in liquid helium, is inside building at right. Over-all "noise" temperature of antenna, amplifier and sky is only 18°K at 5600 megacycles.

ANOTHER STEP TOWARD SPACE COMMUNICATIONS

The above antenna is part of a new ultra-sensitive radio receiving system under development at Bell Telephone Laboratories. It has extraordinary directivity. Beamed skyward, it ignores radio "noise" from the earth, yet picks up extremely weak signals from outer space.

The signals are amplified by the latest Bell Laboratories "maser" amplifier. The maser principle was first demonstrated, using gas, by Prof. C. H. Townes and his collaborators at Columbia University. Bell Laboratories scientists applied it to the solid state guided by a theoretical proposal of Prof. N. Bloembergen of Harvard University. Their latest traveling wave maser amplifier employs a ruby mounted in a waveguide. The ruby is excited to store energy. As signals pass through, they absorb this energy and are thus amplified. The device uniquely combines the characteristics needed for practical space communication: extremely low inherent noise and the ability to amplify a broad frequency band.

At present the receiving system is being used to pick up and measure minute radio noise generated by the atmosphere. It also foreshadows important advances in long distance communications. For example, it could extend the range of space-probe telemetering systems, could help make possible the transatlantic transmission of telephone and TV signals by bouncing them off balloon satellites—and has numerous applications in radio astronomy and radar.

This pioneer development in radio reception is one more example of the role Bell Laboratories plays in the pursuit of better communications technology.

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